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10/782,790	02/23/2004	Kazuhide Tanaka	A8319.0035/P035	5538
24998	7590	06/22/2010	EXAMINER	
DICKSTEIN SHAPIRO LLP			WARTALOWICZ, PAUL A	
1825 EYE STREET NW				
Washington, DC 20006-5403			ART UNIT	PAPER NUMBER
			1793	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/782,790	<b>Applicant(s)</b> TANAKA ET AL.	
	<b>Examiner</b> PAUL A. WARTALOWICZ	<b>Art Unit</b> 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-12, 14-17 and 19-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-12, 14-17 and 19-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 4/19/10 have been fully considered but they are not persuasive.

Applicant argues that Theime does not disclose or suggest any particular heat treatment for the wire and thus the contention that Thieme teaches a heat treatment substantially similar to the heat treatment of the claimed invention is not understood.

However, it appears that Thieme teaches that the sheath overlaying the magnesium boride source powder is heated and subjected to rolling at [0019]. Additionally, Thieme teaches that the Mg-B wire is heat treated at a temperature of 500°C and 1200°C [0078], [0095], [0104]-[0106]. In comparison, the application recites that the layers are integrated into a unitary block by applying the thermal treatment of 800-1100°C (pg. 25, lines 19-28 of instant specification). Based on the comparable disclosures of Thieme and the applicant, it appears that Thieme teaches a substantially similar heat treatment to that instantly claimed. Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.

Applicant argues that Thieme refers to a wire that has Mg-B region, high resistivity barrier layer, and a metal laminate but fails to teach an intermediate layer which is electrically and mechanically unified and integrated with the base member and the cladding layer.

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However, it appears that Theime teaches a metal matrix that is disposed between the barrier layer and the laminate layer, as described in the rejection and taught by Theime at [0015], [0016]. Because the matrix layer is comprised of copper, which is the same material the intermediate layer (current claims 9, 10), it appears that the metal matrix layer of Theime is analogous to the intermediate layer of the current claims.

Additionally, it is noted that claim 28 is labeled as “previously presented” in the copy of amended claims filed. However, claim 28 is a new claim, not previously presented, which is improper per Rule 121 but is being hereby waived.

### ***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9, 10, 12, 14, 15, 17, and 19-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Thieme et al. (U.S. 2003/0036482).

Thieme et al. teach magnesium boride superconducting wires [0002] wherein the magnesium boride, having a density greater than 95% (Abstract) is surrounded by tantalum, niobium, nickel, nickel alloys, iron, or molybdenum, wherein the wire further comprises a metal laminate on the outside of this barrier layer selected from copper, copper alloys, stainless steel, aluminum, aluminum alloys, or nickel alloys [0016]-[0018].

Additionally, Thieme et al. teach a diffusion barrier surrounding the superconductor comprising iron, nickel alloys, tungsten, and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]) wherein the matrix, which overlays the diffusion barrier layer, is copper (this layer corresponds to the junction material between the base metal and the metal cladding of the instant claims, [0015]), wherein the laminate, overlaying the matrix, is made of copper alloy, *inter alia* (this layer corresponds to the metal base of the instant claims, [0018]).

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Additionally, it appears that the diffusion barrier layer (cladding layer) can have an electric resistance of  $7\ \mu\Omega$  or less at room temperature for other embodiments when formed of nickel, *inter alia*. Additionally, it appears that for some embodiments the (diffusion barrier) cladding layer inherently has a Vickers hardness of at least 50 at room temperature as it is made of a similar element, eg. iron, as that instantly claimed.

Additionally, it appears that the laminate (metal base member) can have a Vickers hardness of at least 50 at room temperature as it is made of a substantially similar element, eg. stainless steel containing iron, as that instantly claimed. Additionally, it appears that for some embodiments the laminate (metal base member) inherently has an electric resistance of  $7\ \mu\Omega$  or less at room temperature as it is made of a substantially similar element, eg. copper and nickel, as that instantly claimed.

Additionally, as the laminate (metal base member) covers the matrix (junction auxiliary material) and the barrier layer (cladding layer) [0018], it appears that the metal base member is coaxial with the tubular-shaped metal cladding layer.

Thieme teaches that one or more Mg-B regions are embedded in the matrix [0012]. It appears that a barrier layer (cladding layer) would accompany each Mg-B region [0016] such that there is a plurality of cladding layers as in instant claims 21, 22.

Regarding the limitation of the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers, it appears that Thieme teaches a heat treatment that is substantially similar to the heat treatment instantly claimed [0095] such that one of ordinary skill

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would recognize that the product produced by the heat treatment of Thieme would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers.

Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.

Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685, *In re Fessmann*, 180 USPQ 324, *In re Spada*, 15 USPQ2d 1655, *In re Fitzgerald*, 205 USPQ 594 and MPEP 2113.

As to the limitation of "is assembled into", it is unclear how this limitation lends a patentable distinction between the claimed invention and the prior art. It appears that the prior art meets this limitation as the superconductor and covering metal are abutting the base material (outer covering).

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Nakahara et al. (U.S. 6337307).

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Theime et al. teach a compound sheath as described above.

Theime et al. fail to teach a plurality of the single-core or multi-core wires are assembled into the base metal and they are twisted.

Nakahara et al. teach a superconductor (col. 1) wherein a plurality of single-core wires are assembled into a base metal that are twisted (col. 11-12).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a plurality of single-core wires are assembled into a base metal that are twisted in Theime et al. in order to produce a known superconducting wire as taught by Nakahara et al.

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447) and Nakahara et al. (U.S. 6337307).

Theime et al. teach a compound sheath as described above.

Theime et al. fail to teach a plurality of the single-core or multi-core wires are assembled into the base metal and they are twisted.

Nakahara et al. teach a superconductor (col. 1) wherein a plurality of single-core wires are assembled into a base metal that are twisted (col. 11-12).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a plurality of single-core wires are assembled



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into a base metal that are twisted in Theime et al. in order to produce a known superconducting wire as taught by Nakahara et al.

Claims 9, 10, 12, 14, 15, 17, and 19-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447).

Thieme teaches a method as described above in claim 9.

Thieme fails to teach that the metal matrix is a tin alloy.

Wong, however teaches a superconductor material (col. 1) wherein a metallic matrix comprises tin for the purpose of promoting crystalline growth (col. 4).

Dunand teaches that tin is selected in applications with magnesium boride because tin is non-reactive with magnesium boride (col. 5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a tin matrix in Thieme in order to promote crystalline growth (col. 4) and because tin is non-reactive with magnesium boride (col. 5) as taught by Wong and Dunand, respectively.

Additionally, it appears that the addition of tin in the matrix would give a substantially dense composite structure after heat treatment, such that the combined prior art would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block.

Regarding claim 26, it appears that Thieme teaches the iron containing barrier layer is abutting the magnesium boride [0016].

Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see *In re Best*, 195 USPQ 430.

Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685, *In re Fessmann*, 180 USPQ 324, *In re Spada*, 15 USPQ2d 1655, *In re Fitzgerald*, 205 USPQ 594 and MPEP 2113.

Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Wong (US 5470821) and Dunand (US 6995119 in reliance on provisional 60/295,447) and Tosmic (US 2002/0198111).

Thieme teaches a superconducting wire as taught above in claim 25. In addition, Thieme teaches that the metal laminate is stainless steel (corresponds to layer of the iron alloy surrounding a magnesium boride wire member and tubular shaped copper portion) [0018].

Thieme, however, fails to teach that the inner layer, which is surrounded by intermediate layer and the iron alloy outer layer, is copper.

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Tosmic, however, teaches a MgB wire [0002] wherein the MgB core is surrounded, and abutted, by a layer of copper as determined by the reactivity of the metal layer with the superconducting material [0016].

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide the MgB core of Theime surrounded, and abutted, by a layer of copper as determined by the reactivity of the metal with the superconducting material [0016] as taught by Tosmic.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL A. WARTALOWICZ whose telephone number is (571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz  
June 19, 2010

/Steven Bos/  
Primary Examiner, AU 1793